The Bank of England's supervision of financial market infrastructures — Annual Report

March 2016

BANK OF ENGLAND

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To cover the period 14 March 2015 to 4 March 2016.

Presented to Parliament pursuant to section 203B of the Banking Act 2009 and paragraph 33 of Schedule 17A to the Financial Services and Markets Act 2000 (FSMA), which require the Bank to make a report to HM Treasury at least once a year on:

(a) the discharge of its functions relating to recognised payment systems and recognised clearing houses; and

(b) the extent to which, in its opinion, in discharging those functions its objective to protect and enhance the stability of the financial system of the United Kingdom has been met.

HM Treasury must lay before Parliament a copy of this *Report*.

The Bank is committed to being open and accountable in the performance of its responsibilities and in the use of its powers. The publication of this *Annual Report* is intended to help achieve this in respect of the supervision of recognised payment systems and recognised clearing houses.

4 March 2016

Foreword

Jon Cunliffe
Deputy Governor, Financial Stability

The United Kingdom's financial market infrastructures (FMIs) are critically important, providing functions that are relied upon by the public and financial system every single day. Over the past year, the Bank's supervision of these FMIs has contributed significantly to its financial stability objective. As the financial, economic, and risk landscape within which FMIs operate continues to evolve, so will the Bank's supervision of FMIs.

The FMIs supervised by the Bank sit at the heart of the UK economy and financial system, and the United Kingdom's monetary and financial stability depend on the orderly functioning of these FMIs. Payment systems allow goods and services to be purchased and workers to be paid. Securities settlement systems underpin the operation of stock and bond markets. Central counterparties (CCPs) help to simplify the financial network and protect financial market participants from counterparty default losses.

During the past year, the Bank's risk-based supervision of FMIs has contributed significantly to its financial stability objective. These contributions are set out in Chapter 3 of this *Annual Report*.

In 2015, the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) independently assessed the Bank's supervision of FMIs against the Responsibilities set out in the CPMI-IOSCO *Principles for Financial Market Infrastructures* (PFMIs), concluding that all Responsibilities were fully observed. This assessment confirms the United Kingdom's implementation of international standards in its supervision of FMIs. At the same time the Bank continues to enhance its risk-based supervisory approach, adapting to evolving risk such as operational risk, and cyber risk in particular.

During 2015, the financial, economic, and risk landscape within which FMIs operate continued to evolve. Looking forward, more risk will be concentrated in UK CCPs from mid-2016, following the mandatory requirement to centrally clear certain derivatives contracts in the European Union.

FMIs therefore remain a strong focus of domestic and international regulatory agendas for the year ahead. The Bank is actively involved in driving forward a range of international regulatory work announced in 2015, focusing on the resilience of CCPs, as well as their recovery tools and resolution regimes, in addition to better understanding the key interlinkages between CCPs and their members. This and other changes such as the implementation of the European Central Securities Depositories Regulation during 2016, should contribute to continued improvement in the safety and soundness of FMIs.

Looking further ahead, the Bank continues to assess how developments in payment and distributed ledger technology will affect the FMI landscape, and to consider their supervisory and financial stability implications.

March 2016

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Chapter 1: Financial market infrastructures in context

A small number of regulated firms and systems manage the financial infrastructure underlying most of the economic and financial transactions in the United Kingdom, and many transactions internationally. These are the central counterparties, securities settlement system, and payment systems supervised by the Bank of England in pursuit of its mission to promote the good of the people of the United Kingdom by maintaining monetary and financial stability.

1.1 Systemic importance

Financial market infrastructures (FMIs) are critically important to the UK financial system; they are relied upon by the UK public and financial system every single day.(1) The Bank supervises FMIs as individual entities under applicable regulation, recognising also their central position in the financial system more broadly. The Bank expects boards of FMIs and their management to be mindful of this centrality, and of their role as systemic risk managers.

The Bank supervises the four **central counterparties** (CCPs) located in the United Kingdom: LCH.Clearnet Ltd, ICE Clear Europe, LME Clear, and CME Clearing Europe. CCPs guarantee the performance of their members' trades by legally becoming the 'buyer to every seller, and seller to every buyer', managing risk in the financial system, and concentrating risk within themselves.(2) The value of margin and default funds held by UK CCPs 'backing' this guarantee averaged £90.6 billion in 2015. Mandatory clearing of selected over-the-counter (OTC) interest rate derivatives contracts is expected to begin in the European Union in 2016, further increasing CCPs' systemic importance.

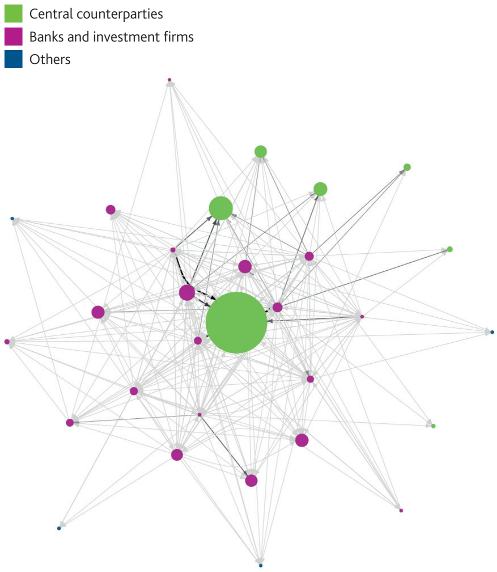
The Bank supervises Euroclear UK and Ireland (EUI), which operates the CREST **securities settlement system**. CREST enables transfer of ownership in UK gilts, money market instruments and equities, and settled a daily average of £581 billion in 2015.(3)

The Bank supervises five systemically important **payment systems**.(4) Payment systems enable the lending and repayment of money, allow businesses to receive payments for goods and services including through internet and mobile banking, and facilitate salary and benefits payments. In 2015, the daily average value of payments settled by CHAPS, Bacs, FPS and Visa Europe was £295 billion.

1.2 Interlinkages

FMIs supervised by the Bank are inherently interlinked with the wider financial system. Interlinkages increase systemic complexity and can propagate and amplify stresses previously contained in one firm or sector, with adverse consequences for financial stability. Macro-prudential risks like these are a focus of the Bank's Financial Policy Committee. **Chart 1** illustrates interlinkages between banks and CCPs.

Chart 1 Interlinkages between banks and CCPs
UK Banks and investment firms' 30 largest counterparties(a)(b)



Source: Bank survey of banks' exposures.

(a) The 30 largest derivative counterparties have been identified based on a survey of 23 UK banks and investment firms' top 20 exposures measured as exposures at default (net of collateral), to each of the following: banks, non-bank financial institutions and non-financial corporations; on 30 June 2015. Only UK subsidiaries of non-UK banks are included as reporting firms.
(b) The size of each node is scaled by reporting firms' total amount of exposures to that firm. Each arrow points from one firm to another firm to which it has exposure. The thickness of the lines is based on the size of the exposure.

(1) Refer to Annex 2 for key statistics.
(2) Rahman, A (2015), 'Over-the-counter (OTC) derivatives, central clearing and financial stability', *Bank of England Quarterly Bulletin*, Vol. 55, No. 3, pages 283–95, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2015/q306.pdf.
(3) Including auto-collateralised repos.
(4) Refer to Annex 1 for more detail on FMIs supervised by the Bank.

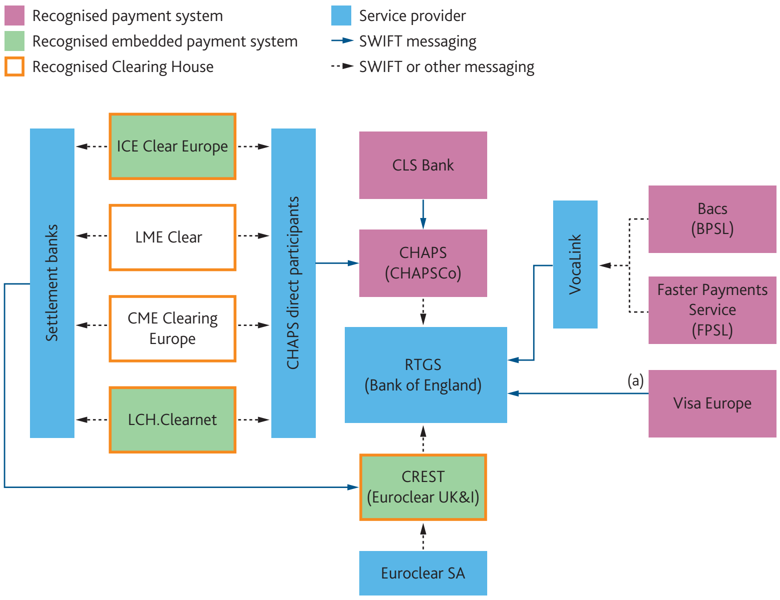
Interlinkages exist between FMIs for operational reasons, and risks crystallising at one FMI may impact another — such as between a security settlement system and a payment system, or between a central counterparty and other types of infrastructures.

FMIs are also interlinked with the banks which provide some of their key services such as payments, settlement, concentration banking, and liquidity provision. **Figure 1** provides a simplified illustration of some of these interlinkages.

Bank research shows that around ten such banks are of particular significance for UK FMIs, and are often also members of the FMIs to which they provide services. Many of these banks are supervised by the Prudential Regulation Authority (PRA).[1] The Bank and PRA supervisory functions work closely together to ensure these interlinkages are understood.

Because FMIs supervised by the Bank are interlinked with the wider financial system, and serve global markets across several jurisdictions, co-operation with other relevant authorities is an essential part of the Bank's supervision of FMIs. This is explored more in the following chapter.

Figure 1 Interlinkages between FMIs and service-providers



(a) Visa Europe also settles payments through settlement banks.

(1) A minority of linked banks are branches of overseas firms, which are not directly supervised by the PRA.

Chapter 2: The Bank's supervisory approach

The Bank's role as supervisor is to ensure that FMIs are managed in a manner that is consistent with the public interest including reducing systemic risk. The Bank's supervision is risk-based and forward-looking, and takes place within the framework of applicable legal regimes and internationally agreed regulatory standards.

2.1 Regulatory regime and supervisory approach for FMIs

The regulatory regimes for all FMIs supervised by the Bank are framed by the *Principles for financial market infrastructures* (PFMIs).(1) Various pieces of legislation apply this framework to recognised payment systems, securities settlement systems, and CCPs.(2) Supervised institutions themselves have primary responsibility for satisfying the minimum standards in the PFMIs, and all applicable regulatory requirements, which are designed to protect the stability of an FMI.

The Bank's supervisory approach is designed to ensure that FMIs' rules and policies satisfy the minimum standards in the PFMIs and comply with all applicable regulatory requirements. The supervisory approach requires supervisors to make forward-looking judgments on the risks posed by FMIs to the Bank's financial stability objective. Where the Bank judges risks unacceptably high it expects the FMI to take action to reduce them.

The Bank's supervisory work is structured according to its FMI Supervisory Risk Assessment Model, which is set out in *The Bank of England's approach to the supervision of financial market infrastructures*.(3) The model's elements encompass external risk factors the FMI is exposed to, and internal factors such as governance; financial mitigants; operational mitigants; and recovery and resolution arrangements.

In 2015, two external peer reviews assessed the Bank's supervision of FMIs.(4) The Committee on Payments and Market Infrastructures (CPMI) and International Organization of Securities Commissions (IOSCO) concluded that the Bank fully observed all of the Responsibilities for authorities set out in the PFMIs. The most recent International Monetary Fund (IMF) Financial Sector Assessment Programme review of the United Kingdom — including the Bank's supervision of FMIs — commenced in 2015, and the Financial System Stability Assessment will be published later in 2016.

2.2 Enhancing the Bank's supervisory approach for FMIs

Identifying and embedding enhancements to the Bank's supervisory approach is a continuous process. Since the previous *Annual Report*, the Bank has enhanced its supervision of FMIs in the following ways:

- further developing the **cross-firm work** agenda, assessing specific elements of supervisory focus (such as cyber risk) across a single class of FMI (such as CCPs), or across all FMI classes;
- starting implementation of an enhanced '**Core Assurance**' **framework**, designed to ensure that all key areas within the supervisory model are assessed to an agreed depth, as part of a rolling multi-year programme of work; and
- supervisors are being **more** '**intrusive**', spending more time on-site at regulated firms carrying out supervisory reviews.

These enhancements are designed to: strengthen consistency of judgement; deepen subject-matter understanding and quality of supervision; focus the Bank's resources more closely on its supervisory agenda, in addition to reactive FMI or legislative-driven work; and raise standards across FMIs through the propagation of sound practices.

During 2015 the Bank made use of its power to commission reports by independent experts and this made a strong contribution to the assurance work carried out by the Bank's supervisors.(5) Looking forward, the Bank anticipates more frequently using its powers to commission independent expert reports, both to enhance core assurance work, and to address areas of specific concern. Supervised firms should anticipate, and make provision for this.

2.3 Organisational structure

Within the Bank, the **Financial Market Infrastructure Directorate** supervises UK-regulated FMIs. The Bank's

(1) Available at www.bis.org/cpmi/publ/d101a.pdf.
(2) Annex 1 sets out key supervisory legislation to which these FMIs are subject.
(3) *The Bank of England's approach to the supervision of financial market infrastructures*, April 2013, Table B, available at www.bankofengland.co.uk/financialstability/Documents/fmi/fmisupervision.pdf.
(4) CPMI and IOSCO published a report on its assessment and peer review of 28 jurisdictions' application of the five Responsibilities included in the PFMI. This is available at www.bis.org/cpmi/publ/d139.pdf.
(5) When these reports are commissioned costs are recovered from the relevant FMIs.

FMI Board is an executive committee constituted by the Governor to exercise the Bank's statutory functions in relation to FMIs.(1) The Court of the Bank keeps the FMI Board's performance under review. Minutes of the FMI Board are provided to the Court, members of which can, and do, attend FMI Board meetings.

2.4 Co-operative supervision

Co-operation with other authorities is an essential part of the Bank's supervision of FMIs. This approach is supported by the PFMIs, which require central banks, market regulators, and other relevant authorities, including prudential regulators, to 'co-operate…domestically and internationally…in promoting the safety and efficiency of FMIs.'(2)

The Bank co-operates **domestically** with the Financial Conduct Authority (FCA) in relation to the supervision of markets and market infrastructure, and the Payment Systems Regulator in relation to payment systems (see Box 1), under memoranda of understanding (MoUs) which are reviewed annually.(3) MoUs set out the high-level framework for co-operation and co-ordination by the signatory authorities in exercising their relevant functions, to ensure each is able to advance its objectives.(4) Authorities which are signatories to these MoUs are present at the Bank's FMI Board for relevant agenda items.

In line with the Financial Services Act 2012, the FCA and Bank reviewed the operation in 2015 of their MoU that sets out how they should co-operate with one another in relation to the supervision of markets and market infrastructure. As part of this review, a survey of industry respondents identified no material instances of duplication and respondents acknowledged the efforts made by both authorities on co-operation.

The Deputy Governor for Financial Stability at the Bank and the FCA's CEO considered the views of industry and staff and concluded that the MoU's arrangements for co-operation remain effective, with appropriate co-ordination and no material duplication and have evolved over the past year in response to the FCA's reorganisation. They emphasised their continued commitment to effective co-operation and that staff should work together to take forward the suggestions from industry.

Many of the FMIs supervised by the Bank are used by market participants internationally. The Bank is at the forefront of **international co-operative oversight** through chairing global supervisory colleges for the most internationally significant UK CCPs. In 2015, the Bank chaired global colleges for LCH.Clearnet Ltd and ICE Clear Europe, bringing together supervisory authorities from a range of countries. Authorities assessed key areas at these two global systemically important FMIs, including: liquidity stress testing; margin methodologies; and product and model changes. In 2015, the Bank, in its capacity as resolution authority, also formed a 'Crisis Management Group' on resolution planning for LCH.Clearnet Ltd, which is further described in Section 3.4 of this *Report*.

European Market Infrastructure Regulation (EMIR) colleges also play an important role in CCP supervision.(5) EMIR requires the Bank to consult a college of EU authorities on decisions related to CCP authorisation, significant changes to risk models, and the introduction of new products. In 2015, the Bank reviewed the effectiveness of each of the four EMIR colleges for UK CCPs, and, based on feedback from college members, concluded that the colleges were meeting their objectives.

The Bank works closely with other international authorities in respect of the UK FMIs it supervises, notably with the Commodity Futures Trading Commission (CFTC) and the Securities Exchange Commission (SEC) in the United States in relation to UK CCPs registered with those authorities. The Bank welcomes the announcement by the European Commission and the CFTC of a common approach regarding requirements for CCPs.(6) This promotes global regulatory convergence, and should mean that European CCPs will be able to do business in the United States more easily and that US CCPs can continue to provide services to EU companies.

The Bank continues to participate in the international **supervisory arrangements for CLS and SWIFT**, discharging its responsibility for supervising CLS primarily through the CLS Oversight Committee, a collective oversight arrangement organised and administered by the United States Federal Reserve. SWIFT provides a financial messaging platform which is systemically important to the United Kingdom and to the global financial system, but it is neither an FMI nor recognised under UK legislation. In order to exercise oversight of this entity, the Bank participates in the international SWIFT Oversight arrangements chaired by the National Bank of Belgium.

The European **Central Securities Depositories Regulation (CSDR)** provides for co-operation between authorities through information-sharing and co-operation requirements between

(1) *Governance of the Bank*, December 2014, Annex C. Available at www.bankofengland.co.uk/about/Documents/matters122014.pdf.
(2) PFMIs, Responsibility E.
(3) The PRA is also a signatory to these MoUs. The MoU in relation to markets and market infrastructure is available at www.bankofengland.co.uk/about/Documents/mous/statutory/moumarket.pdf. The MoU in relation to payment systems in the United Kingdom is available at www.bankofengland.co.uk/about/Documents/mous/statutory/moupsr.pdf.
(4) This fulfils the obligations of the Authorities under section 99 of the Financial Services (Banking Reform) Act 2013.
(5) Regulation (EU) No 648/2012 on OTC derivatives, central counterparties and trade repositories (EMIR).
(6) The Joint announcement is available at http://ec.europa.eu/finance/financial-markets/docs/derivatives/20160210-eu-cftc-joint-statement_en.pdf.

Box 1
The Payment Systems Regulator

The Payment Systems Regulator (PSR) became fully operational in April 2015. It has three objectives in relation to payment systems in the United Kingdom: to promote competition; innovation; and the interests of service-users (the people and businesses that use them). The Bank is responsible for the supervision of recognised payment systems as part of its objective to protect and enhance the financial stability of the United Kingdom. The Bank and the PSR must have regard to the objectives of the other, and the Bank has welcomed the opportunity to engage and co-operate with the PSR over the last year, building a strong working relationship.

To underpin this relationship the Financial Services (Banking Reform) Act 2013 sets out a number of regulatory principles designed to ensure the authorities co-operate effectively. These principles are codified in a MoU between the authorities, addressing: timely and focused exchange of relevant information; co-operation in respect of regulated entities; co-ordinated exercise of functions and policy; and co-ordinated representation of the United Kingdom at international meetings.[1] The Bank and the PSR will review the operation of this MoU annually.

The Bank recognises that the PSR may need to consider a range of measures in order to determine the best way to advance its objectives. Changes to payment systems could present opportunities to further enhance financial stability, but could also present risk. The Bank has set out four key criteria against which, in the Bank's view, potential changes to payment systems should be assessed from a financial stability perspective.[2] The criteria are:

- changes should not lead to an unacceptable increase in settlement risk;
- changes should maintain or enhance the robustness and resilience of UK payment systems;
- UK payment systems should facilitate the continuity of payment services in resolution; and
- the Bank's ability to effectively supervise systemically important payment systems must be maintained.

The Bank will continue working closely with the PSR, supporting it whilst ensuring these four criteria are met.

(1) The MoU in relation to payment systems in the United Kingdom is available at www.bankofengland.co.uk/about/Documents/mous/statutory/moupsr.pdf.
(2) Available at www.bankofengland.co.uk/financialstability/Documents/fmi/psrconsresponse.pdf.

authorities. The Bank welcomes the opportunity to co-operate closely with other authorities in the authorisation and supervision of relevant Central Securities Depositories, whose safety and soundness is important to UK financial stability.

Chapter 3: Report on the Bank's supervision of FMIs over the past year

Over the past year, the Bank's supervision of FMIs has contributed significantly to its statutory objective to protect and enhance the stability of the financial system of the United Kingdom.[1] Governance and financial risk mitigants continued to be key focuses for supervisory work, with improvements being made in several areas. Cyber resilience supervisory work was progressed through FMI participation in the 'CBEST' programme, and through initiation of a cross-firm assessment of cyber risk management. The Bank was, and continues to be, actively involved in shaping and delivering international regulatory work to improve CCP resilience and resolvability.

This chapter reviews progress in areas identified in last year's *Annual Report*, and in other key elements of the Bank's supervisory work. This chapter also reviews progress in policy-related initiatives that aim to strengthen the regulatory framework for the future.

During the year, an additional payment system — Visa Europe — was recognised by HM Treasury and so became subject to the Bank's supervision. Box 2 gives an overview of this process.

At the end of this chapter, Box 4 provides an update on the important role played by the Bank in the ongoing development of, and the benefits anticipated from, the European Securities Financing Transactions Regulation.

3.1 Governance

Governance continues to be a strong focus of the Bank's supervision of FMIs. The Bank expects the board and management of FMIs to take full responsibility for managing the infrastructure in a manner that protects the stability of the FMI and with regard to the financial system as a whole. The Bank, as supervisor, assesses how well the senior executives and boards of FMIs perform against this responsibility, looking for evidence that institutions' management decisions reflect the importance to the wider system of the infrastructures that they run, and the cost that the disruption or failure of the infrastructures would impose on external stakeholders.

Last year's annual report noted the mandatory introduction, under EMIR, of **CCP board risk committees** composed of independent members, clearing members and clients, whose role is to advise the CCP board in its decision-making regarding key areas of risk for the CCP. The board risk committee's role is to advise; EMIR makes clear that '[t]he board of a CCP assumes final responsibility and accountability for managing the CCP's risks'.[2]

Over the past year, the Bank and the PRA carried out a review of **initial margin model governance** at CCPs and their key clearing members . Four areas were identified where effectiveness could be improved: sharing model information between CCP and clearing members; clearing member due diligence on models; communication of the results of due diligence; and CCP board consideration of due diligence in their decision-making. The Bank set out these observations and related expectations to a joint Bank/PRA meeting of UK CCP management, risk committee members, and risk experts from clearing member firms in September 2015. The Bank will re-assess the effectiveness of CCP margin model governance in 2016 (see Section 4.2.3).

Throughout the year the Bank assessed changes made by several payment systems in response to third-party reviews of their **boards** undertaken in 2014 at the request of Bank supervisors. Changes have resulted in improvements to the structure and composition of these boards, and their sub-committees in particular. In the past year, the Bank's supervision has addressed a shortfall in the number of **independent board members** at a number of FMIs.

Supervision has recently focused more closely, for all FMIs, on **board effectiveness**. In the past year, supervisors assessed the effectiveness of a wide range of board executives and independent non-executives, through a schedule of regular meetings. Supervisors also carried out in-depth assessments of the quality of challenge in important board-level decisions at a number of FMIs. The Bank also made use of its power to commission reports by independent experts and this made a strong contribution to the Bank's supervisory work, and supported supervisors' judgements. The Bank expects to make more regular use of independent expert reports in future, following a practice already used by the PRA.

(1) The Bank's financial stability objective is stated in the Bank of England Act 1998 section 2A. Making a report on the Bank's supervision of FMIs over the past year is in accordance with the requirements of the Banking Act 2009 section 203B, and the Financial Services and Markets Act 2000 Schedule 17A paragraph 33.
(2) EU 153/2013 Article 4.4.

Box 2
'Recognising' payment systems

The statutory framework underpinning the Bank's payment system supervision contains two 'recognition' criteria to identify payment systems that should be subject to the Bank's supervision.[1] These criteria are used by HM Treasury to determine which systems to recognise.

The first criterion identifies systems that would have the potential 'to threaten the stability of, or confidence in, the UK financial system' if there were any deficiencies in their design or if their operation were disrupted. Such a threat to the financial system could be expected to manifest itself through the system acting as a channel for contagion between its users, or through disruption to core financial markets.

The second criterion identifies systems where any deficiency in design or disruption to their operation could have 'serious consequences for business or other interests throughout the United Kingdom'. Such consequences could include the disruption of a payment system used widely in the real economy for which there was no practical substitute.

Alongside its supervision of recognised payment systems, the Bank performs a horizon scanning role to assess unrecognised payment systems against the recognition criteria, and to determine their importance to UK financial stability. This analysis is discussed at periodic meetings with HM Treasury, which may then decide to recognise any additional payment systems. In March 2015, HM Treasury issued a statutory recognition order making the Visa Europe payment system subject to the Bank's supervision in light of its importance to the UK financial system.

(1) Banking Act 2009 section 185: Recognition criteria.

Overall, the Bank concluded that board effectiveness should be enhanced in a number of areas, and the appropriate work is being undertaken.

3.2 Financial risk mitigants

Supervisory work has helped improve the robustness of a range of financial risk mitigants across FMIs, and policy work is laying the groundwork for further improvements going forward.

In September 2015, **prefunding** was introduced for two UK 'deferred net settlement' payment systems — Bacs and FPS. Prefunding eliminates settlement risk in Bacs and FPS by requiring members to fully fund their net obligations with reserves held at the Bank. This represents the completion of a long-term project involving several areas of the Bank, payment systems, and system members, that will bring material benefits for UK financial stability.

The Bank has made further progress this year in addressing the risks associated with **tiering**, with one further material indirect participant becoming a direct CHAPS participant thereby reducing the credit, liquidity, and operational risk it faces in its payment arrangements. There is also a growing number of indirect participants considering direct participation over the next year.

In 2014, the Bank published **research on the procyclicality** of CCPs' risk-based initial margin models.[1] Model procyclicality can exacerbate liquidity difficulties in times of market stress by requiring parties posting margin to find additional liquid assets, when it is most difficult for them to do so. The PFMIs and European regulation therefore recognise that, subject to being adequately risk sensitive, margin models should not be overly procyclical.[2] During the year, CCPs have made progress towards embedding procyclicality considerations in their risk frameworks to ensure that these risks are considered going forward.

Supervisory assurance work on financial risk management at UK CCPs often entails cross-firm analysis. In 2015, such work has been undertaken in a wide range of financial risk mitigation areas, notably: measurement and risk mitigation of **intraday margin coverage**; calculation techniques for **collateral haircuts**; the process of managing the default of a clearing member through **hedging and auctions**; and CCPs' additional collateral calls on members to maintain the level of financial resources at the regulatory requirement at all times ('**default fund additional margin**'). These analyses aim to raise standards across CCPs through the propagation of sound practices.

The Bank considers it important for the safety and soundness of CCPs that they have access to appropriate **liquidity arrangements** for the currencies they clear. This is first and foremost the responsibility of the CCPs themselves but access to central bank liquidity can provide a backstop arrangement. In November 2014, the Bank widened access to the Sterling Monetary Framework (SMF) to CCPs operating in UK markets, either authorised under EMIR or recognised by the European

(1) Available at www.bankofengland.co.uk/financialstability/Pages/fpc/fspapers/fs_paper29.aspx. A list of recent FMI-related research papers can be found at Annex 7.
(2) EU 153/2013 Article 28.

Box 3
European Central Bank's (ECB)/ Bank of England's measures to enhance financial stability

In March 2015, the ECB and the Bank announced a series of measures aimed at enhancing financial stability in relation to centrally cleared markets within the EU, specifically:

- enhanced arrangements for information exchange and co-operation regarding UK CCPs with significant euro-denominated business; and
- extension of the scope of the standing swap line between the ECB and the Bank in order, should it be necessary and without pre-committing to the provision of liquidity, to facilitate the provision of multi-currency liquidity support by both central banks to CCPs established in the United Kingdom and euro area respectively. CCP liquidity risk management remains first and foremost the responsibility of CCPs themselves.[1]

The Bank has since been working with the ECB in order to implement these enhanced arrangements for information exchange and co-operation.

(1) The news release is available at www.bankofengland.co.uk/publications/Pages/news/2015/044.aspx.

Securities and Markets Authority (ESMA).[1] CCPs are eligible to apply for access to reserves accounts and the Discount Window Facility. Given their systemic importance to the UK economy and financial stability, the provision of liquidity insurance through the SMF will assist these firms to manage their liquidity in times of market-wide or firm-specific liquidity stress. A number of CCPs have applied for SMF access.

In 2015, the ECB and the Bank announced an extension to the scope of their standing swap line in order, should it be necessary and without pre-committing to the provision of liquidity, to facilitate the provision of multi-currency liquidity support by both central banks to CCPs established in the United Kingdom and euro area respectively (see Box 3).

In January 2016, CCPs began making **quantitative disclosures** required by CPMI-IOSCO. These disclosures will help to enhance stakeholders' ability to assess CCPs' resilience. The Bank will assess compliance with disclosure requirements through its supervisory work in 2016.

Interoperability describes an arrangement in which two or more CCPs operate a clearing link which enables clearing members of one CCP to clear trades matched with clearing members of the other interoperable CCP(s). Interoperability can expand market access and increase the scope for reducing margin requirements for offsetting trades, but also creates exposures between CCPs. In 2013, ESMA issued *Guidelines and Recommendations* for establishing consistent, efficient and effective assessments of interoperability arrangements. The Bank took an active role in this work, and subsequently developed proposals for implementing the *Guidelines and Recommendations* in specific areas, consulting with firms during 2014.[2] In July 2015, the Bank published details of the supervisory approach it will take towards assessing CCP interoperability arrangements to implement ESMA's *Guidelines and Recommendations*.[3]

3.3 Operational risk mitigants

Cyber resilience continued to be a key focus of the Bank's supervision during 2015, supporting FMIs participating in the 'CBEST' programme. This follows the Bank's Financial Policy Committee recommendation that 'The Bank…work with firms at the core of the UK financial system to ensure that they complete CBEST tests and adopt individual cyber resilience action plans'.[4]

CBEST delivers controlled, bespoke, intelligence-led cyber security tests, which provide the Bank with information on an FMI's capability to detect and respond to cyber attacks. A number of FMIs have programmes in place to implement recommendations resulting from CBEST, with several more in the process of completing CBEST tests, and others scheduled to begin testing in 2016.

In late 2015, the Bank initiated a cross-firm assessment of three additional components of FMIs' management of cyber risks: governance; situational awareness; and information sharing arrangements. This work will extend into 2016 and will complement the CBEST results to inform an assessment of UK FMIs' management of cyber resilience, which the Bank will feed back to FMIs in due course.

Cyber risk policy work is also progressing internationally. The Bank has participated in the CPMI-IOSCO working group responsible for developing guidance for FMIs to enhance

(1) *The Bank of England's Sterling Monetary Framework*, (the 'Red Book') is available at www.bankofengland.co.uk/markets/Documents/money/publications/redbook.pdf.
(2) Available at www.bankofengland.co.uk/markets/Documents/cpesma1114.pdf.
(3) Available at www.bankofengland.co.uk/financialstability/Documents/fmi/CCP_interoperability_arrangements_0715.pdf.
(4) The record of the relevant Financial Policy Committee meeting is available at www.bankofengland.co.uk/publications/Documents/records/fpc/pdf/2015/record1507.pdf. Part A of the Financial Policy Committee's July 2015 *Financial Stability Report* provides further detail; and is available at www.bankofengland.co.uk/publications/Documents/fsr/2015/fsr37sec6.pdf.

their cyber resilience. This is intended to provide supplemental guidance to the PFMIs, and details measures that FMIs should execute to augment their cyber resilience capabilities with the aim of reducing the risks posed by cyber threats to financial stability. The guidance will be published during 2016 following a consultative report published in November 2015.(1)

FMIs' focus on cyber resilience should not be at the expense of ensuring that appropriate, robust **operational risk management frameworks** are in place for all operational risks to which FMIs are exposed. The boards of FMIs are responsible for setting their firms' operational risk appetite, for communicating it clearly to management, for monitoring operational incidents to ensure these are within appetite, and for taking effective timely action when this is not the case. During 2015, supervisory work has focused closely on improving operational risk management arrangements at FMIs where the Bank has concerns they are falling short of the Bank's expectations.

CCPs are designed to manage the **default of a clearing member**. But, because clearing member default can present significant risk to a CCP, and potentially the wider financial system, the Bank has focused in the past year on assessing several aspects of CCPs' default management arrangements, with conclusions informing supervisory work during 2016.

The Bank completed a cross-firm assessment of UK CCPs' default management '**fire drills**'. These exercises simulate the default of a clearing member and are used to practice and evaluate the CCP's ability to manage a clearing member default. Clearing members and other stakeholders also participate. EMIR requires CCPs to simulate their default management procedures at least annually.(2) The Bank's cross-firm assessment has identified a number of potential improvements to arrangements across a range of default management and fire drill practices.

Individual CCP fire drills do not fully reflect the potential stresses on CCPs and clearing members in circumstances where more than one CCP is managing the default of a common clearing member. Therefore the Bank developed, jointly with BaFin and Deutsche Bundesbank, an exercise for LCH.Clearnet Ltd and Eurex Clearing AG to carry out '**parallel**' **default management fire drills**. The aims of this exercise were to assess: clearing members' ability to second staff to default management groups of more than one CCP; the operational capacity of clearing members and CCPs to hedge in a 'multiple-CCP' scenario; and clearing members' ability to receive and process multiple auction files. These drills took place during February 2016, and the Bank is working with BaFin, Deutsche Bundesbank, and fire drill participants to assess the outcomes.

In August 2015, the London Money Market Association, EUI and LCH.Clearnet Ltd, working in conjunction with the relevant areas of the Bank, completed the migration of LCH.Clearnet Ltd's clients' gilt general collateral repurchase business from a product that settled by overnight Delivery by Value to one that settles by **Term Delivery By Value**. The advantage of this product is that it does not unwind settlement each day, reducing unnecessary cash flows, settlement risk and operational risk.

In the past year, supervisors undertook a cross-firm review of all FMIs' **Internal Audit** functions, reflecting the importance the Bank places on Internal Audit functions' ability to provide genuine challenge to management and drive improved governance, risk management and internal controls.(3) This review identified a number of potential areas for improvement.

Where appropriate, the Bank has encouraged payment systems to work together to address issues of shared relevance, including requiring certain systems to analyse the extent to which they can **act as substitutes** for one another in the event of an operational outage. The Bank considers substitutability a key mechanism to reduce the systemic impact of operational disruptions such as the payments-related incidents at RBS and HSBC during the summer of 2015. There is further work to be done, by the Bank and payments sector, to make substitution a reliable operational mitigant.

To facilitate cross-payment system co-operation more generally, including sharing of best practice to improve operational efficiency and risk management, Bacs, CHAPS and FPS have created the Interbank System Operators Coordination Committee. The Bank welcomes this development and expects the Committee will play an active role in propagating robust systemic risk management practices across payment systems.

3.4 Recovery and resolution

The PFMIs require FMIs to have in place **recovery plans** that can be implemented to recover from threats to their viability and financial strength that might otherwise prevent them from providing critical functions to the markets they serve. This is a UK statutory requirement for CCPs and securities settlement systems. UK legislation also requires CCPs to develop 'loss allocation' rules, designed to allocate to clearing members losses sustained by a CCP either following the default of a

(1) Available at www.bis.org/cpmi/publ/d138.pdf.
(2) Regulation (EU) No 153/2013 supplementing Regulation (EU) No 648/2012 with regard to regulatory technical standards on requirements for central counterparties, section 59.12.
(3) The Bank news release welcoming the publication of the guidance 'Effective Internal Audit in the Financial Services Sector', is available at www.bankofengland.co.uk/publications/Pages/news/2013/087.aspx.

clearing member or due to certain 'non-default' events (such as investment losses), with the objective of ensuring that the CCP can continue providing its critical functions, preserving financial stability.(1)

The Bank assessed CCP and payment system **recovery plans** in the past year, identifying a number which required updates to address aspects of CPMI-IOSCO guidance.(2) Areas for further improvement included refining approaches to identifying **critical functions**; and better defining recovery triggers and 'early warning' indicators.

Crisis Management Groups (CMGs) are designed to provide a framework for authorities to plan the orderly resolution of FMIs that are systemically important in more than one jurisdiction.(3) Orderly resolution should minimise the impact of the failure on financial stability, maintain critical functions, and minimise the risk to public funds. The Bank, in its capacity as resolution authority, established in 2015 a CCP CMG for LCH.Clearnet Ltd, the first CMG for any CCP globally. Seventeen authorities are represented, including the Bank.

3.5 International regulatory CCP work

In April 2015, the Financial Stability Board (FSB), together with the Basel Committee on Banking Supervision (BCBS)and CPMI-IOSCO, published a CCP Workplan addressing CCP resilience, recovery, resolvability, and inter-dependencies among CCPs and their direct and indirect members.(4) The Workplan is scheduled to complete its information gathering, analysis and recommendation work by the end of 2016. **The Bank is taking an active role** in shaping and delivering several Workplan elements.

3.5.1 CCP resilience

This element of the Workplan evaluates the adequacy of existing standards for CCP loss absorption capacity and liquidity, including the PFMI standards for margin methodologies and stress testing arrangements. This work has been informed by a series of questionnaires — designed to stock-take current practice — completed by a large number of CCPs including those supervised by the Bank. From a domestic perspective, *The Bank of England's approach to stress testing the UK banking system* published in October 2015, notes that consideration is being given to supervisory stress tests of the wider financial system.(5)

CPMI-IOSCO have also undertaken a stock-take of existing CCP recovery mechanisms and loss allocation tools, with the Bank contributing data and analysis on UK CCPs. A CPMI-IOSCO consultation paper addressing findings and proposals on CCP Resilience and Recovery matters is expected to be published in 2016.

3.5.2 CCP resolvability

This Workplan element entailed a stock-take of existing CCP resolution regimes and resolution planning arrangements, to identify powers currently available to authorities in each jurisdiction to resolve CCPs, and arrangements for developing resolution strategies and plans. Based on this information, consideration is being given to the need for, and development of, standards or guidance for CCP resolution planning, resolution strategies and resolution tools, including cross-border co-ordination. This Workplan element expects to report its findings by the end of 2016.

3.5.3 Interdependencies

CCPs are closely interlinked with other participants in the financial system. For example CCP members often also provide financial services to CCPs and to their clients (see Section 1.2). A Study Group on Central Clearing Inter-dependencies has been established, in which the Bank participates, to collect and analyse information on interlinkages, and publish a report on the interconnections between CCPs and clearing members. This will explore in more depth these interdependencies and the potential for any spillovers related to recovery steps taken by CCPs or banks where such interdependencies exist.

(1) Financial Services and Markets Act 2000 (Recognition Requirements for Investment Exchanges and Clearing Houses) Regulations 2001 SI 2001/995, Schedule.
(2) *Recovery of financial market infrastructures*, October 2014, available at www.bis.org/cpmi/publ/d121.pdf.
(3) See the Financial Stability Board's *Key Attributes of Effective Resolution Regimes for Financial Institutions* Key Attribute 9. This is available at www.fsb.org/wp-content/uploads/r_141015.pdf.
(4) This is available at www.fsb.org/wp-content/uploads/Joint-CCP-Workplan-for-2015-For-Publication.pdf.
(5) This is available at www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf, Box 5.

Box 4

Increasing transparency in market-based financing — Securities Financing Transactions Regulation

In November 2015, the final text of the Securities Financing Transactions Regulation (SFTR) was published in the Official Journal of the EU. The SFTR is a key part of the international initiative to regulate risks beyond the core banking sector and will implement the FSB's recommendations on *Standards and Processes for Global Securities Financing Data Collection and Aggregation*, published in November 2014. These standards aim to help transform sectors beyond core banking into resilient market-based finance by **improving the transparency of securities financing transactions** through mandating the daily reporting of all securities financing transactions (SFTs) to trade repositories. These standards also support the Financial Policy Committee responsibility to identify, assess, monitor and take action in relation to risks across the UK financial system, including risks from beyond the core banking sector. The SFTR is modelled in part after derivatives reporting under EMIR. It will introduce the following requirements:

- details of SFTs will be reported to trade repositories no later than the working day following the conclusion, modification or termination of the transaction, and made available for competent authorities;
- counterparties will have to keep SFT records for at least five years following the termination of the SFT; and
- trade repositories will regularly publish aggregate positions by SFT type.

The Bank has been involved in both the FSB discussions and the SFTR negotiations to ensure that the international recommendations and European legislative proposals are aligned and support the Bank's objectives. Work on the SFTR's detailed technical standards for SFT reports commenced in Autumn 2015. The Bank is contributing to the ESMA drafting group tasked with finalising the draft technical standards by the beginning of 2017. Reporting under the SFTR will likely commence in mid-2018.

Chapter 4: Future developments and priorities for 2016

FMIs operate in a financial, economic, regulatory, and risk landscape which continues to evolve. The advent of mandatory clearing in 2016 will concentrate more risk in CCPs, further increasing their importance in the financial system. Authorities continue to implement post-crisis regulatory reforms, and the Bank will work with stakeholders to identify and address unintended consequences emerging from these reforms. Both the PSR's pursuit of its statutory objectives, and the emergence of new financial technologies, may have implications for the payment systems landscape and associated FMIs. The Bank's supervision of all FMIs will continue to evolve, taking these developments into account, in order to further contribute to the Bank's objective of promoting and enhancing UK financial stability.

4.1 Future developments

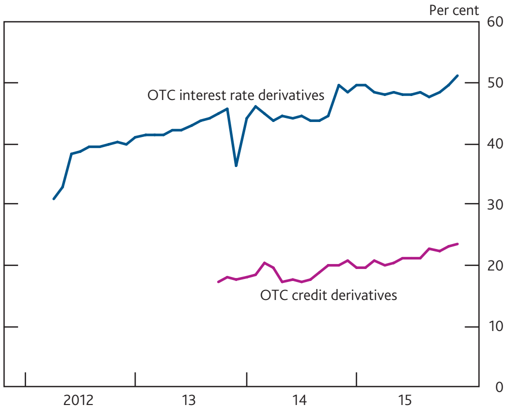
4.1.1 Mandatory central clearing

The 2008 financial crisis and subsequent economic recession created an imperative for financial regulatory change, to reduce the likelihood of crises on a similar scale in future. In 2009, a package of reforms was agreed by the G20, of which mandatory central clearing was an important part designed to increase transparency, enhance risk management, and to simplify the complex interdependencies inherent in the largest OTC markets.(1)

Implementation of OTC derivatives reforms is well underway. Progress is more advanced in the largest derivatives markets (see **Chart 2**), and in 2016 the first mandatory clearing requirement in the European Union will commence. The largest users of derivatives will become subject to mandatory central clearing rules for certain OTC interest rate derivatives, and mandatory clearing for certain OTC credit derivatives will likely follow.

The importance of CCPs will therefore increase as mandatory clearing **concentrates more risk within a small number of CCPs**. The PFMIs and EMIR substantially increased regulatory standards for CCPs. To complement this the Bank is actively involved in driving forward a range of international regulatory work announced in 2015, focusing on: CCP resilience; recovery tools for CCPs; and CCP resolution.(2) This work will inform the Bank's CCP supervisory work and judgments on the extent to which CCP risks are appropriately managed and mitigated.

Chart 2 Percentage of gross notional outstanding globally in OTC interest rate derivatives and OTC credit derivatives which is centrally cleared



Sources: DTCC trade information warehouse reports and Bank calculations.

Given the urgency of reform following the crisis, the scale and scope of the reforms and their interlinked nature, it is to be expected that there will be places where adjustment is needed, where reforms are not working as intended or where there are conflicts between different regulatory objectives.(3)

The BCBS is currently considering how to treat derivative exposures for centrally cleared client transactions. Some market participants have argued that the **leverage ratio** imposes excessive capital requirements on centrally-cleared client trades, which they say could affect the viability of existing business models and ultimately the provision of client clearing services. Though the leverage ratio does not normally allow collateral to reduce exposures, the Bank supports an exception to allow initial margin to reduce leverage exposures for centrally cleared client trades to promote the continuity and affordability of client clearing services.(4)

(1) See the *Improving financial regulation — Report of the Financial Stability Board to G20 leaders*, September 2009, available at www.fsb.org/wp-content/uploads/r_090925b.pdf.
(2) See Section 3.5
(3) *Cover note to Bank of England response to European Commission call for evidence on the EU Regulatory Framework for Financial Services*, January 2016. Available at www.bankofengland.co.uk/financialstability/Documents/regframework/covernote010216.pdf.
(4) *Detailed answers from Bank of England response to European Commission call for evidence on the EU Regulatory Framework for Financial Services*. January 2016, available at www.bankofengland.co.uk/financialstability/Documents/regframework/detailedanswers010216.pdf.

A more **differentiated approach** to banking regulation according to the size of firms could facilitate competition, growth and stability. The Bank's response to the European Commission's consultation on how revised bank capital requirements have affected lending set out some aspects of regulation that could be adjusted. These include **exempting small financial counterparties from the clearing obligation** under EMIR.(1) Some UK firms are finding it difficult to gain access to central clearing on cost-effective terms. The Bank is concerned that some may decide to cease hedging interest rate risk: for example on fixed rate mortgage lending.(2)

4.1.2 Payment systems landscape

The PSR became fully operational in April 2015, and is taking forward its objectives in relation to payment systems in the United Kingdom (see Box 1). The Bank anticipates that this will result in changes to the payment system landscape, with consequent implications for the Bank's supervision of payment systems.

In January 2016 the Bank announced that it will develop a blueprint to **modernise the UK's sterling settlement infrastructure** to respond to changing needs. The blueprint will cover four themes: the Bank's policy objectives in the delivery of RTGS; the functions of the UK's high-value payments system; access to RTGS; and the role of the Bank in the delivery of the service.(3) In light of the emerging results of the blueprint, the Bank will review whether any changes are necessary to the supervisory model for the high-value sterling payment system.

4.1.3 Financial technology

Technology in financial services is an area of increasing interest and focus for financial market participants, infrastructure providers, and authorities. There are a number of new developments, such as distributed ledger technology, that may impact financial market infrastructures and the landscape they operate in. While some of these developments may present familiar challenges, others may pose new questions altogether. The Bank continues to develop its expertise and capability to assess how these developments could impact financial stability. Where necessary, the Bank will take steps to mitigate material risks.

4.2 Priorities for 2016

This section sets out the Bank's current priorities for UK FMIs for 2016. Recognising the increasing importance of FMIs and the complexity of the landscape in which they operate, the Bank will remain focused on key risks to financial stability. Priorities are subject to review as new risks emerge.

4.2.1 Operational and cyber resilience

Operational resilience will continue to be a major priority for the Bank's supervision of all FMIs in 2016. Supervisors will draw on operational risk specialists from across the Bank and the PRA to help inform the assessment of FMIs' operational risk management frameworks and governance. The Bank may also commission independent expert reports to enhance supervisory work. The Bank expects that **cyber resilience** will remain a significant theme throughout 2016, progressing cyber work initiated in 2015.

The Bank will assess the appropriateness of the operational requirements that payment systems place on their participants, as inadequate arrangements at participant firms could be a significant source of disruption to the wider system.

4.2.2 CCP recovery

Greater use of central clearing has increased the systemic importance of CCPs. International policy work is underway to review and strengthen recovery and resolution arrangements of CCPs.(4) The Bank will continue to assess the adequacy of recovery plans, in light of existing requirements and guidance, including UK statutory provisions regarding loss allocation rules.

4.2.3 Board effectiveness

The Bank will continue to emphasise the importance of capable, robust **governance** at regulated FMIs, focusing on the effectiveness of FMI boards (both individually and collectively), and firm culture. The Bank will follow up its 2015 work on the effectiveness of CCP margin model governance, to ensure that improvements are bedding in, both at CCPs and at clearing members.

4.2.4 Ring-fencing of UK banking groups

The Financial Services (Banking Reform) Act 2013 requires large UK banking groups (those with more than £25 billion of core deposits) to 'ring-fence' their core activities into ring-fenced bodies (RFBs) by 2019 in order to ensure the continuity of provision in the United Kingdom of 'core services'. Core services which will need to be placed into RFBs are: facilities for the accepting of deposits or other payments into an account which is provided in the course of carrying on the core activity of accepting deposits; facilities for withdrawing money or

(1) *Response of the Bank of England to the European Commission's public consultation on the possible impact of the CRR and CRD IV on bank financing of the economy*, Bank of England, October 2015, available at www.bankofengland.co.uk/pra/Documents/crdiv/responsecrrcrdivbankfinancing.pdf. See also *High-level overview of Bank of England response to the European Commission call for evidence on the EU Regulatory Framework for Financial Services*, January 2016, available at www.bankofengland.co.uk/financialstability/Documents/regframework/highleveloverview010216.pdf.
(2) *Bank of England, HMT and Financial Conduct Authority response to the European Commission's Consultation on the Review of the European Market Infrastructure Regulation (EMIR)*, September 2015, noted in the *High-level overview of Bank of England response to the European Commission call for evidence on the EU Regulatory Framework for Financial Services*, January 2016. Available at www.bankofengland.co.uk/financialstability/Documents/regframework/highleveloverview010216.pdf.
(3) The Bank news release is available at www.bankofengland.co.uk/publications/Documents/news/2016/878.pdf.
(4) An EU legislative proposal on FMI recovery and resolution is expected in 2016. It is important that this legislation implements the CPMI-IOSCO and FSB international guidance published in October 2014 and is consistent with any further international guidance developed by these bodies.

making payments from such an account; or overdraft facilities in connection with such an account.(1)

As banking groups restructure to comply with ring-fencing over the next three years, this will lead to changes in how they access FMIs which may generate additional **operational risk** during this period. An HM Treasury Order requires RFBs, in general, to participate directly in payment systems.(2)

4.2.5 Supervision under CSDR

The Central Securities Depositories Regulation (CSDR) aims to increase the safety and efficiency of securities settlement in the European Union. The CSDR entered into force in September 2014 and the related technical standards are expected to become law by 2016 Q2. The United Kingdom currently has one CSD, EUI. It will have six months from 2016 Q2 to submit an application for authorisation under the new regime to the Bank. The Bank will then assess whether the application is sufficient for authorisation.

The EMIR authorisation process for CCPs delivered significant improvements in the safety and soundness of CCPs (described in Section 2.1 of the *Supervision of financial market infrastructures Annual Report 2015*),(3) and the Bank's expectation is that **CSDR authorisation will deliver similar improvements for CSDs**. A further element of the CSDR, which the Bank supports, is co-operation amongst international authorities where a CSD provides cross-border services. This co-operation is designed to identify, and support mitigation of, risks to UK financial stability from non-UK CSDs.

CSDR will also require all UK firms that settle securities outside a CSD ('internalised settlement') to provide to the Bank quarterly aggregated reporting of securities transactions volumes and values. From mid-2018, CSDs will have to provide monthly and annual data on settlement failures with relevant information on how settlement efficiency can be improved.

4.3 Supervisory assurance work in 2016

In addition to the priorities set out above, this section signposts areas of work planned for 2016, either to provide supervisory assurance, or as the basis for policy development.

4.3.1 Prefunding

Following the successful implementation of prefunding in Bacs and FPS, participants unilaterally set their own 'net sender caps' which are confidential to each bank. Previously caps were set formulaically in Bacs and were communicated to all other participants in FPS.(4) Inappropriately set caps may pose financial stability risk through blocked payments, or increased operational risk from making unplanned changes in cap size. In 2016, the Bank will assess how effectively both schemes are managing these risks.

4.3.2 Outsourcing

A number of FMIs have outsourced elements of their operations. In 2016, supervisors plan to carry out assurance work to determine the extent to which FMIs' controls over outsourcing and group-sourcing are adequately designed and operating effectively.(5) Improvements will be required where this is not the case.

4.3.3 Stress testing

Stress testing is an essential component of CCP risk management. The PFMIs require CCPs to carry out rigorous stress testing to determine the financial resources they need to manage credit and liquidity risks in a range of extreme but plausible market conditions. EMIR requires CCPs to have in place sufficient pre-funded resources to withstand the simultaneous default of at least the two largest members (by credit exposure) in extreme but plausible market conditions ('Cover 2').(6)

In 2017, supervisory assurance work in this area will begin to assess the extent to which CCPs' practices align with CPMI-IOSCO additional guidance on stress testing and a range of other topics, which is expected to be published in 2016 (see Section 3.5.1).

4.3.4 CCP business models

A cross-firm analysis of CCPs' business models is planned for 2016, increasing supervisors' understanding of emerging risks and supporting early supervisory intervention where required.

The Bank expects that a commercially successful CCP will sustain and improve its risk management capabilities, and steer away from excessive strategic risk-taking. The converse also applies: a CCP with a failing business model may face incentives to reduce investment in crucial infrastructure, cut headcount in key functions or seek profit in ways that could impact financial stability (for example, by competing on margin or raising fees to a level which disincentivises central clearing). The Bank's supervision reinforces its expectation that CCPs will mitigate these risks.

4.3.5 Payment system financial risk management

In 2016, the Bank will conduct a cross-firm review into the adequacy of recognised payment systems' **financial risk management**. Appropriate financial risk management is

(1) Section 142C of the Financial Services and Markets Act 2000, inserted by the Financial Services (Banking Reform) Act 2013.
(2) The Financial Services and Markets Act 2000 (Excluded Activities and Prohibitions) Order 2014.
(3) Available at www.bankofengland.co.uk/publications/Documents/fmi/annualreport2015.pdf.
(4) Each participant's net debit settlement position is subject to a cap (the 'Net Sender Cap'). Once a cap is reached a participant can no longer send payments until its net position recedes (ie until it receives payments) or settlement occurs.
(5) See for example PFMIs 3.17.20.
(6) EMIR, Article 43.2.

necessary to ensure that payment systems identify all of their potential financial liabilities, including credit and liquidity risks where appropriate, and manage these effectively.

4.3.6 CCP clearing member default management fire drills

Work on 'parallel' CCP fire drills will continue, involving CCPs, regulators and CCP clearing members to plan and execute a second 'parallel' CCP fire drill, building on lessons learned from the first. Objectives will be more stretching, potentially including stressed market conditions, or testing operational arrangements for transferring clients of a defaulted clearing member to other, surviving, members.

Annex 1: FMIs supervised by the Bank and the key supervisory legislation to which they are subject[1]

Central counterparties (CCPs) are regulated under **FSMA** as recognised clearing houses (**RCHs**) and under EMIR. The embedded payment systems of LCH.Clearnet Ltd and ICE Clear Europe are also both recognised interbank payment systems under the **Banking Act 2009**.

CME Clearing Europe Limited	Clears a range of OTC and exchange-traded derivatives and spot commodities contracts.
ICE Clear Europe Limited[2]	Clears a range of exchange-traded derivatives and OTC credit default swaps.
LCH.Clearnet Limited	Clears a range of exchange-traded and OTC securities and derivatives.
LME Clear Limited	Clears a range of metal derivatives traded on the London Metal Exchange, and OTC metal contracts.

Payment systems meeting defined criteria may be recognised by HM Treasury. Recognised payment systems are supervised by the Bank under the **Banking Act 2009**.

Bacs	Operated by Bacs Payment Schemes Limited (BPSL), processes higher volume and lower value payments, such as salary, benefit, Direct Credit and Direct Debit payments.
CHAPS	Operated by CHAPS Clearing Company Limited (CHAPS Co), is the United Kingdom's high-value payment system, providing real-time gross settlement of sterling transfers between participants.
CLS	Operates the world's largest multi-currency cash settlement system for foreign exchange transactions in 18 currencies, including sterling.
Faster Payments Service (FPS)	Operated by Faster Payments Scheme Limited (FPSL), processes standing orders and electronic retail transactions, including transactions generated in internet, mobile and telephone banking.
Visa Europe	Visa Europe is a payments technology business owned and operated by member banks and other payment service providers from 38 countries.

Securities settlement systems may be regulated under **FSMA** as RCHs and are subject to the **Uncertificated Securities Regulations 2001** in the United Kingdom. Euroclear UK and Ireland Limited operates the CREST system, which is also a recognised interbank payment system under the **Banking Act 2009**.

Euroclear UK and Ireland Limited (EUI) CREST	EUI operates the CREST system — the securities settlement system for UK gilts and money market instruments, as well as UK equities — which settles on a gross delivery versus payment basis (EUI also operates CREST for the purposes of settling Irish equities).

(1) This annex sets out the FMIs that are the main focus of the Bank's supervision. The Bank also has other responsibilities, such as under the Settlement Finality Directive (see Annex 6) and in respect of Recognised Overseas Clearing Houses (see www.bankofengland.co.uk/financialstability/Pages/fmis/supervised_sys/rch.aspx).
(2) ICE Clear Europe is regulated as an RCH under FSMA; its application for EMIR authorisation has been submitted and is being processed.

Annex 2: FMI data[a]

CCPs (by default waterfall)[b]

		Total initial margin requirement (£ equivalent, millions)		Default fund (£ equivalent, millions)		Number of clearing members	Operational availability of core systems	Products cleared
		2015	2014	2015	2014	Dec. 2015	2015	
CME Clearing Europe[c]		26	16	131	135	19	100%	Clears a range of OTC and exchange-traded derivatives and spot commodities contracts.
ICE Clear Europe	Credit default swaps	4,524	4,492	798	876	22	99.94%	Clears a range of exchange-traded derivatives and OTC credit default swaps.
	Futures and options	21,648	17,593	1,210	974	73		
LCH.Clearnet Ltd[d][e]	Commodities	312	3,984	79	358	21	99.94%	Clears a range of exchange-traded and OTC securities and derivatives.
	Equities	983	739	180	185	39		
	ForexClear	292	148	261	202	23		
	Listed Interest Rate	16	6	29	16	11		
	RepoClear	9,091	9,457	806	793	77		
	SwapClear	41,440	27,693	2,739	2,583	100		
LME Clear[f]		5,684	5,487	363	391	42	100%	Clears a range of metal derivatives traded on the London Metal Exchange, and OTC metal contracts.

Recognised payment systems

		Volume		Value (£ millions)		Number of settlement bank members	Operational availability	Important payment types
		2015	2014	2015	2014	Dec. 15	2015	
Bacs		24,031,791	23,087,866	18,143	17,473	16	100%	Higher volume and lower value payments, such as salary, benefit, Direct Credit and Direct Debit payments.
CHAPS		148,411	144,352	270,400	268,615	22	100%	Settlement of financial market transactions including CLS sterling pay-ins and pay-outs and house purchases.
CLS	All currencies	846,044	790,346	3,171,521	3,101,570	64	99.90%	Settlement of foreign exchange transactions in 18 currencies, including sterling.
	Sterling	56,552	56,521	236,003	236,564			
CREST[g]	Sterling	174,435	181,329	578,689	675,678	16	99.94%	Settlement of gilts, equities and money market instruments (including in respect of the Bank's Open Market Operations and repo markets transactions more generally).
	US dollar	6,202	5,244	1,470	1,356			
	Euro	4,767	4,139	852	650			
	Total CREST	185,404	190,712	581,011	677,684			
Faster Payments Service		4,928,992	4,351,502	4,114	3,572	10	100%	Standing orders and electronic retail transactions, including transactions generated in internet, mobile and telephone banking.
Visa Europe	All issuance	53,433,201	47,184,351	2,250	2,120	67[h]	100%	Card payments.
	UK domestic issuance	30,944,801	27,772,736	1,395	1,274	42[h]		

(a) Volumes and values are the daily averages for 2015, unless otherwise noted.
(b) Except for CME Clearing Europe whose data is aggregated across both its default waterfalls.
(c) 2015 daily averages are for the period 1 October 2015 to 31 December 2015.
(d) The 2014 average initial margin requirement and default fund figures for LCH.Clearnet Ltd's Commodities waterfall cover the period from 22 September 2014 to 31 December 2014 due to the launch of LME Clear on 22 September 2014.
(e) LCH.Clearnet's 2014 Initial Margin requirement has been revised to include Initial Margin add-ons.
(f) LME Clear launched in 2014 and therefore 2014 average values are the daily averages for 22 September 2014 (launch date) to 31 December 2014. 2013 values are not applicable.
(g) Volumes and values include auto-collateralised repos.
(h) UK International Principal Members.

Annex 3: 2015 *Annual Report* commitments

All commitments made in the *Supervision of financial market infrastructures Annual Report 2015* have been met. Further detail can be found in the relevant section of this *Annual Report*.

2015 *Annual Report* section	2015 *Annual Report* commitment	2016 *Annual Report* section
3.1 Forward-looking priorities		
3.1.1 Credit and liquidity risk		
1	In particular, the Bank will contribute to CPMI-IOSCO's work to explore the case for additional regulatory guidance on the design of CCP stress tests.	3.5.1
3.1.2 Recovery and resolution		
	None	3.4 3.5.1
3.1.3 Operational risk management		
2	The Bank has assigned supervisory priorities that aim to address the root cause of excess operational risk at the affected FMIs and supervisors will monitor the implementation of these priorities over the coming year.	3.3
3	Work will also continue…to improve resilience against cyber attack at all supervised FMIs.	3.3
3.1.4 Governance		
4	…the Bank will place a particular focus on the quality of governance at UK CCPs to ensure *inter alia* that commercial objectives are not inappropriately prioritised over systemic risk management.	3.1
5	Furthermore…ensuring CCP['s board risk committees] are robust and resilient relies on a joint effort not just from CCPs and regulators but also their users, and the Bank will work with PRA supervisors to achieve this.	3.1
3.1.5 Disclosure		
6	The Bank will expect UK CCP's to begin making the public quantitative disclosures set out by the CPMI-IOSCO standards in this area.	3.2
3.2 EMIR and mandatory central clearing		
7	[T]he Bank will continue to implement the new CCP supervisory framework established by EMIR.	2.1, 2.2
8	The Bank will also continue to monitor the impact of increased central clearing on the safety and soundness of UK CCPs as well as on UK financial stability more generally.	3.5
3.3 Payment systems landscape changes		
9	The Bank will continue to provide input into industry discussions on payment systems strategy in the United Kingdom to ensure that financial stability is given due consideration. The Bank will continue to engage with these discussions by, among other things, actively participating in the PSR's Payments Strategy Forum established by the PSR.	Box 1
10	The Bank will use [four defined] criteria when assessing any proposals for change in the payments landscape…	Box 1

Annex 4: Glossary of terms

Central counterparty
An entity that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer.

Central securities depository
An entity that provides securities accounts, central safekeeping services, and asset services, which may include the administration of corporate actions and redemptions, and plays an important role in helping to ensure the integrity of securities issues (that is, ensure that securities are not accidentally or fraudulently created or destroyed or their details changed).

Collateral
An asset or third-party commitment used by a collateral provider to secure an obligation vis-à-vis a collateral taker.

Credit risk
The risk of loss due to the failure of a counterparty to perform on a contractual obligation on time and in full. Credit risk arises whenever future cash flows are due from parties who may not provide them.

Default fund
A fund consisting of assets contributed by members of a system that would be used to pay liabilities of defaulting members.

Deferred net settlement
A net settlement mechanism which settles on a net basis at the end of a predefined settlement cycle.

Exposure
The maximum loss that might be incurred if assets or off balance sheet positions are realised, or if a counterparty (or group of connected counterparties) fail to meet their financial obligations.

G20
The G20 group comprises 19 countries and the European Union, representing the world's largest economies, whose finance ministers and central bank governors have met periodically since 1999.

Interoperability
An arrangement in which two or more CCPs operate a clearing link which enables clearing members of one CCP to clear trades matched with clearing members of the other interoperable CCP(s).

Liquidity risk
The risk that a party does not have sufficient funds to meet an obligation when it becomes due, or can only obtain those funds at an unexpectedly high cost.

Loss allocation
Rules or arrangements specifying how losses in excess of a CCP's pre-funded resources would be allocated.

Operational risk
The risk that deficiencies in information systems or internal processes, human errors, management failures, or disruptions from external events will result in the reduction, deterioration, or breakdown of services provided by an FMI.

Payment system
An entity enabling payments to be transferred and settled across an infrastructure according to a set of predetermined multilateral rules.

Securities settlement system
An entity enabling securities to be transferred and settled by book entry according to a set of predetermined multilateral rules. Such systems allow transfers of securities either free of payment or against payment.

Settlement risk
The general term used to designate the risk that settlement in a funds or securities transfer system will not take place as expected. This risk may comprise both credit and liquidity risk.

Systemic risk
The risk that the inability of one or more participants to perform as expected will cause other participants to be unable to meet their obligations when due.

Tiering
Tiered participation occurs when direct participants in a system provide services to other institutions to allow them to access the system indirectly.

Trade repository
An entity that maintains a centralised electronic record (database) of transaction data.

Annex 5: Abbreviations used in this *Annual Report*

BCBS	Basel Committee on Banking Supervision
BPSL	Bacs Payment Schemes Limited
CCP	central counterparty
CEO	chief executive officer
CFTC	Commodity Futures Trading Commission
CHAPS	Clearing House Automated Payment System
CHAPS Co	CHAPS Clearing Company Limited
CLS	Continuous Linked Settlement
CME	Chicago Mercantile Exchange
CMG	Crisis Management Group
CPMI	Committee on Payments and Market Infrastructures
CSD	central securities depository
CSDR	Central Securities Depositories Regulation
EBA	European Banking Authority
ECB	European Central Bank
EEA	European Economic Area
EMIR	European Market Infrastructure Regulation
ESMA	European Securities and Markets Authority
EUI	Euroclear UK & Ireland Limited
FCA	Financial Conduct Authority
FMI	financial market infrastructure
FPS	Faster Payments Service
FPSL	Faster Payments Scheme Limited
FSB	Financial Stability Board
FSMA	Financial Services and Markets Act 2000
ICE	Intercontinental Exchange
IOSCO	International Organization of Securities Commissions
LCH	London Clearing House
MoU	memorandum of understanding
OTC	over the counter
PFMIs	Principles for financial market infrastructures
PRA	Prudential Regulation Authority
PSR	Payment Systems Regulator
RCH	recognised clearing house
RFB	Ring-fenced body
RTGS	real-time gross settlement
SEC	Securities and Exchange Commission
SFT	securities financing transaction
SFTR	Securities Financing Transactions Regulation
SMF	Sterling Monetary Framework
SWIFT	Society for Worldwide Interbank Financial Telecommunication

Annex 6: Legislation, regulation and standards

The Bank's supervision of FMIs is shaped by different pieces of legislation, regulation and standards at UK, EU and international level.

UK legislation

The principal pieces of UK legislation that shape the Bank's supervision of FMIs are:

- Part 5 of the Banking Act 2009, which established the statutory oversight regime for interbank payment systems;
- FSMA, which set out responsibilities and powers in respect of the supervision of RCHs; and
- the Uncertificated Securities Regulations 2001, to which operators of securities settlement systems are subject.

EU regulation

The activities of CCPs in the United Kingdom are subject to regulation by the Bank under EU law, namely the European Regulation on OTC derivatives, central counterparties and trade repositories of July 2012, commonly known as the European Market Infrastructure Regulation (EMIR). EMIR came into force in August 2012 and many of the main associated technical standards to support it came into force in March 2013. EMIR and the technical standards are directly applicable in the United Kingdom. Therefore, UK-incorporated CCPs need to satisfy the provisions of the Regulation and standards, together with any additional domestic requirements, in order to achieve and maintain authorisation under EMIR.

The Central Securities Depositories Regulation (CSDR), came into force in September 2014, and establishes common EU laws for Central Securities Depositories (CSDs). The Bank, along with other EU authorities, has assisted the European Securities and Markets Authority (ESMA) and the European Banking Authority (EBA) in developing the draft technical standards mandated by the CSDR since 2013. These detailed rules have now been submitted by ESMA and the EBA to the European Commission for the scrutiny and approval process with its co-legislators, the European Council and European Parliament. As with EMIR, the United Kingdom's existing regime will continue to apply to CSDs until a decision on an authorisation or recognition under the new regime has been reached.

The Securities Financing Transactions Regulation (SFTR) came into force in November 2015. It mandates the daily reporting of all securities financing transactions to trade repositories. More detail on the SFTR is provided in Box 4.

International standards

As part of the Bank's supervisory approach, each supervised UK FMI is assessed annually against international standards, as set out in the Principles for financial market infrastructures (PFMIs) published by the Bank for International Settlements' Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions (CPMI-IOSCO) in April 2012. The Bank expects supervised FMIs to perform an annual self-assessment against these standards as an input into the Bank's own assessment. Since both EMIR and the CSDR draw on the PFMIs for much of their content, there is overlap between these international standards and the EU regulations for CCPs and CSDs. For recognised payment systems, the Bank has adopted the PFMIs without amendment as the principles to which, under the Banking Act 2009, operators of recognised payment systems must have regard when operating their systems.

Settlement Finality Directive

The EU Directive on Settlement Finality in Payment and Securities Settlement Systems (Directive 98/26/EC) was implemented into UK law by the Financial Markets and Insolvency (Settlement Finality) Regulations 1999.(1) The Bank is the United Kingdom's designating authority.(2) Designated systems receive protections against the operation of normal insolvency law in order to ensure that transactions that have been submitted in the system are irrevocable, to reduce the likelihood of legal challenge to the finality of settlement and to ensure the enforceability of collateral security. The Bank maintains a list of UK designated systems on its website.(3)

Companies Act 1989

Under the Companies Act 1989, the Bank has various powers regarding CCP default rules. These include reviewing CCPs' default rules and giving directions concerning action taken under those default rules. The Bank can also make an Order recognising that the relevant provisions of the default rules of an EEA CCP or third-country CCP satisfy relevant requirements. The Bank must maintain and publish a register of Orders made.

(1) SI 1999/2979 (as amended from time to time).
(2) The FCA is the designating authority in respect of recognised investment exchanges.
(3) www.bankofengland.co.uk/financialstability/Pages/fmis/supervised_sys/systems.aspx.

Annex 7: List of Bank research papers on FMI topics published or accepted for publication

Title	Authors	Publication	Publication Date
Interactions among high-frequency traders	Evangelos Benos, James Brugler, Erik Hjalmarsson and Filip Zikes	*Bank of England Working Paper 523*	February 2015
Filtered historical simulation Value-at-Risk models and their competitors	Pedro Gurrola-Perez and David Murphy	*Bank of England Working Paper 525*	March 2015
Centralized trading, transparency and interest rate swap market liquidity: evidence from the implementation of the Dodd-Frank Act	Evangelos Benos, Richard Payne and Michalis Vasios	*Bank of England Working Paper 580*	January 2016
Testing the test: how reliable are risk model backtesting results?	Emmanouil Karimalis, Paul Alexander and Fernando Cerezetti	Bank Underground Blog	January 2016
CCPs in crisis: ICCH, NZFOE and the Stephen Francis affair	David Murphy, Bob Cox and Edwin Budding	*Journal of Financial Market Infrastructures*, Volume 4, Number 3	February 2016
Identifying historical episodes for CCP stress testing	David Macdonald and David Murphy	*Journal of Financial Market Infrastructures*, Volume 4, Number 3	February 2016
A comparative analysis of tools to limit the procyclicality of initial margin requirements	David Murphy, Nick Vause and Michalis Vasios	*Bank of England Working Paper*	Forthcoming
Price discovery and the cross-section of high-frequency trading	Evangelos Benos and Satchit Sagade	Accepted for publication, *Journal of Financial Markets*	Forthcoming